Defense Contract Management Command

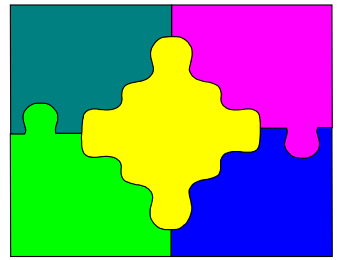
Processes and Process Proofing

JULY 1999/REV. -

Workshop Content

- What is a Process
- Process Structures/Families/Etc.
- Identify Processes
- Determining Key Processes and Risk
- Prioritizing/Selecting a Process for Proofing
- Who, What, When and Why Proofing
- Understanding the Process - HOW
  - Identifying the Requirements
  - Assessing Inputs
  - Flowing the Process
- Assessing the Process as Defined
- Proofing Questions
- Assess Outputs
- Document Proofing Efforts
- Utilizing Proofing Results
- Summary

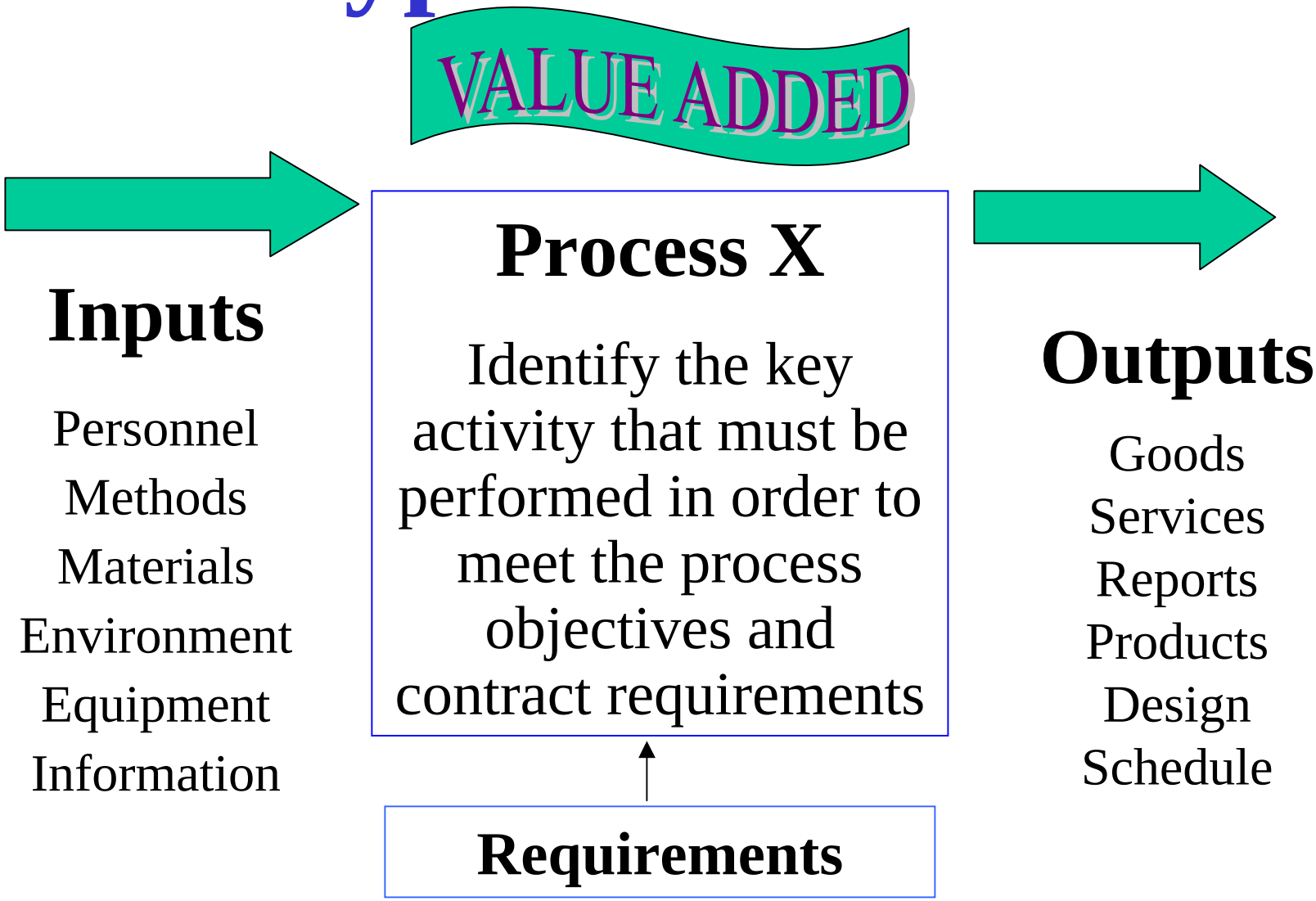
What is a Process?



"The combination of people, equipment, materials, methods and environments that produce output--given product or service. A process can involve any aspect of a business…(2) a planned series of actions of operations which advances material or procedure from one stage of completion to another, (3) a planned and controlled treatment…"

Source: DSMC Glossary Defense Acronyms & Terms

Typical Process



Process Structure and Relationships

- **Systems** (*or process families*) **and their sub-systems are natural groupings of related processes and controls within a manufacturing/business system**

- **Process - a series of tasks leading to a common objective and satisfying a requirement**

- **Task - actions/steps taken by an individual leading to the completion of a process**

Systems and Process Families

Program Planning and Control

Cost/Schedule Management

Engineering Change Management

Business Planning and Administration

Purchasing
Estimating
Contract Admin
Accounting
Govt. Prop
Material Mgt

Product Design and Definition

Systems Engineering
Design/Test Management
Software Development

Product Delivery

Manufact. Mgmt.
Quality Assur/System
Product Integrity/
Technical Requirements

Product Support

Provisioning
Warranty
Technical Data

Sub-Systems and Their Processes

Manufacturing Mgmt. Systems

Manufacturing Engineering
Manufacturing Planning
Facility Management
Work Measurement
Prod., Scheduling and Control
Packaging, Handling and Transport

Quality Assurance/System

Quality Control Planning
Work Instructions/Records
Nonconforming Supplies
Corrective Action
Supplier Quality Assurance
Metrology and Calibration

Subcontract Acquisition Management/Purchasing

Advanced Subcontract Planning
Subcontract Negotiation or Award
Subcontract Administration

Sub-Systems and Their Processes

(CONT.)

Contract Administration

Estimating
Forward Pricing Rate Agreements
Indirect Cost Control
Compensation

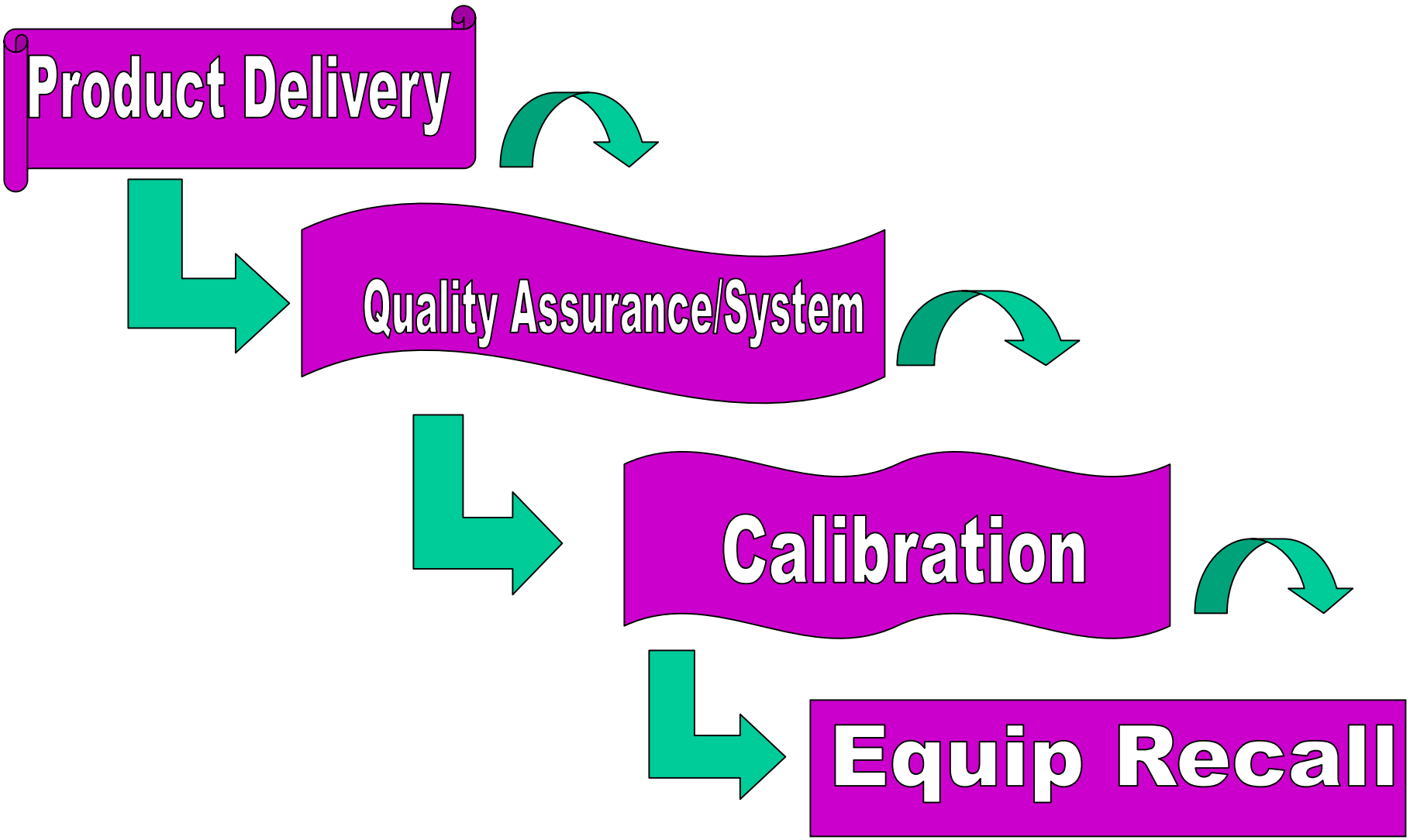
Engineering and Design Mgmt.

Software Development
Test Management
Performance Management
Configuration
Program Management

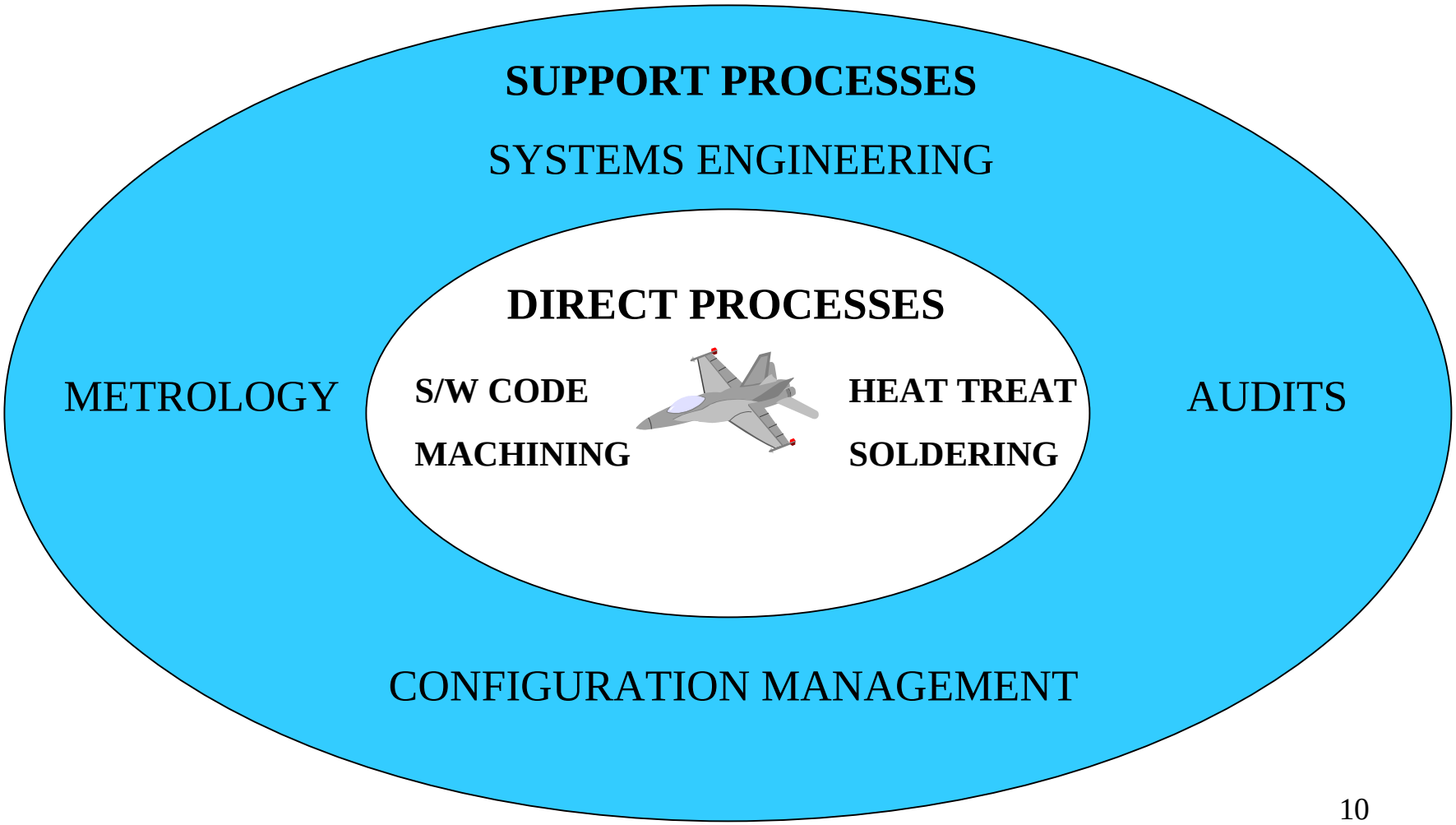
Property Management

Property Acquisition
Receiving
Inventory Control
Utilization & Consumption
Allocability
Disposition
Maintenance

System: Sub-System: Process: Tasks



Support & Direct Processes



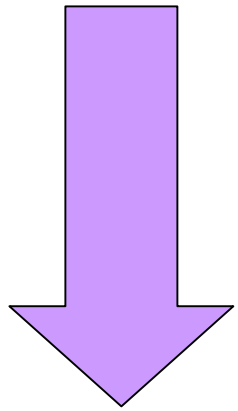
Identifying Processes

- Review Contract and related documents
  - SOW, Drawings, Test and Performance Specs, CDRLs and Schedules
- Review Contractor's Documents
  - Procedures, Method Sheets, Work Instructions, P.O.s, Work Orders, Flowcharts, Control Plans
- Become Familiar with the Facility, Systems and Products

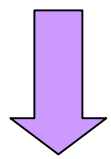
Identifying Processes

- **Quality System Processes (Commonly found at most Contractor Facilities)**
  - Receiving & Reviewing Contract Information
  - Purchasing
  - Maintaining/Calibrating Equip and Tools
  - Control of Drawings
  - Production Planning and Control
  - Performing Operational Functions/ Mfg.
  - Inspecting/Reviewing Output

After Identifying Processes Next Step



Select Key Processes



Assess Risk

Key Process

SIGNIFICANT AFFECT ON PRODUCT/CONTRACT TECHNICAL PERFORMANCE, COST AND SCHEDULE

Processes determined to be of a critical nature are identified/labeled as *Key Processes*

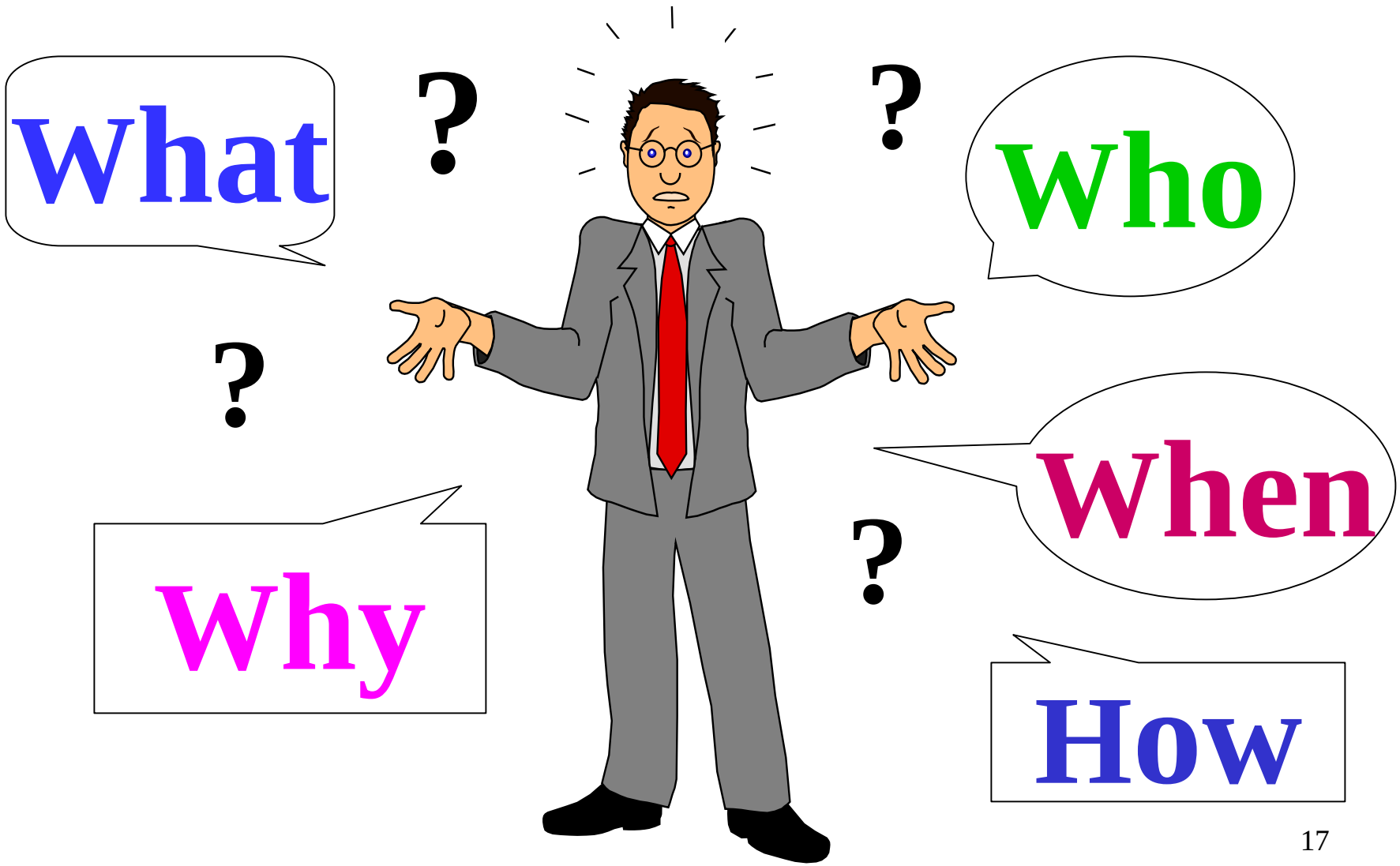
Process Risk Assessment

- **Each Key Process Is Risk Classified**
- **Based on Data Analysis - Sources: CUSTOMER, DCMC, Second Party AND CONTRACTOR** (Consider: history, capacity, capability, maturity and contractor responsiveness)
- **Three Risk Levels - High, Moderate and Low**
- **Use Team Approach to Decision Making**

Selecting and Prioritizing a Process for Proofing

- **Identified as KEY PROCESS** *(Critical)*
- **Processes identified as HIGH RISK**
  - **Assess Relative Severity of Risk - Consider:**
    - » **Criticality of Process/Impact on End Item**
    - » **Process Complexity**
    - » **Process Controls**
    - » **Process Maturity**
    - » **Process Performance**
    - » **Visibility and Customer Needs**

Process Proofing

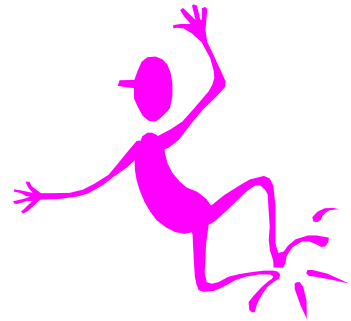


Process Proofing

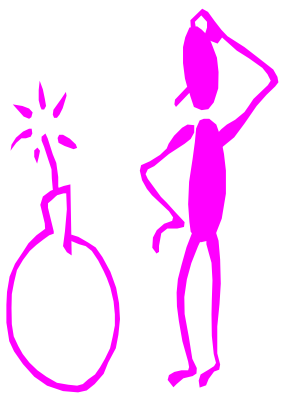
- **Who - All functional Technical Specialists can do Process Proofing (may be done as a team)**
- **What - Comprehensive Audit of Process Inputs, Steps and Outputs**
- **When -**
  - Conducted on all previously identified high risk key processes IAW prioritized list
  - May be conducted on all moderate level processes- to help establish confidence
  - Conducted when significant changes may affect process output (reproofing)

Process Proofing

- **Why**

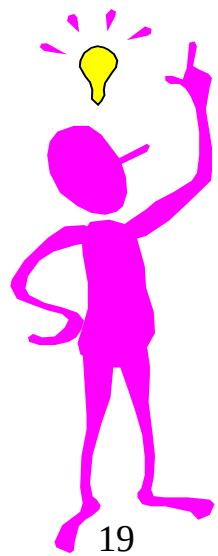


– To provide confidence in a contractor's process to produce the desired outcome



– To identify reasons for high risk rating leading to correction or improvement

– Develop improvement topics/opportunities for PROCAS & Management Councils



– Helps reduce reliance on inspection

Process Proofing

- **How**
  - **Identify Contractual Requirements governing the process**
  - **Identify Process Inputs and Conduct a Comprehensive Review of Inputs:**
    - **Methods**
    - **Materials**
    - **Equipment**
    - **Personnel/Skills**
    - **Environment**
    - **Information**

Do they conform to *cost*, *schedule* *and* *technical* contractual requirements?

Can they be enhanced to improve the process?

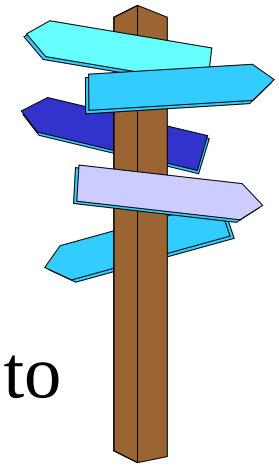
Process Proofing

“Understanding the Process”

or

“Gaining Profound Knowledge”

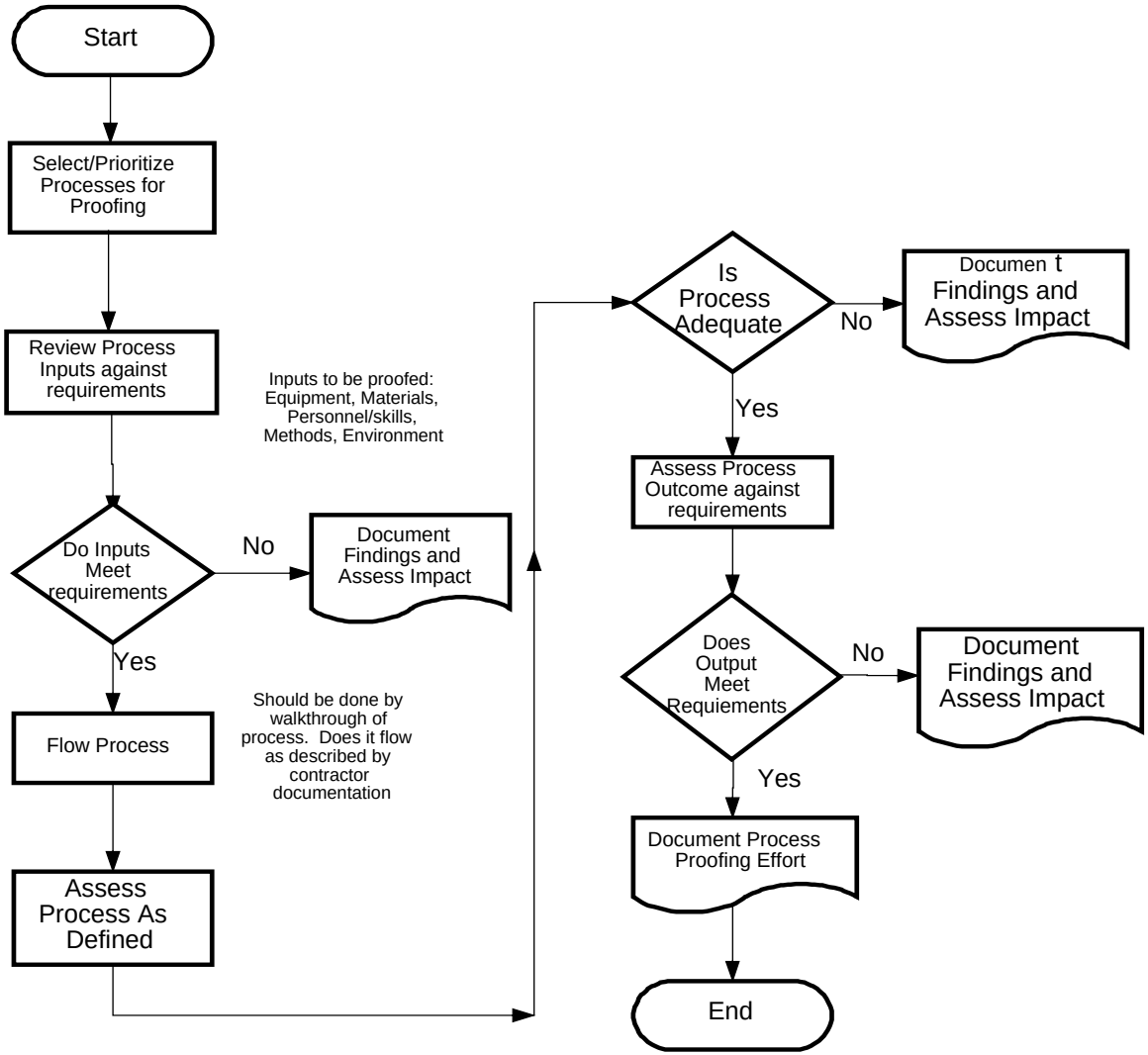
Process Proofing



- **How**
  - **NO ONE WAY TO PROOF A PROCESS**
  - Your method/steps of proofing will depend to some extent on:
    - contractor's system of documenting efforts
    - your familiarity with the process
  - May identify contractual requirements first or flowchart/sequence the events first or review inputs first or use **blended approach**

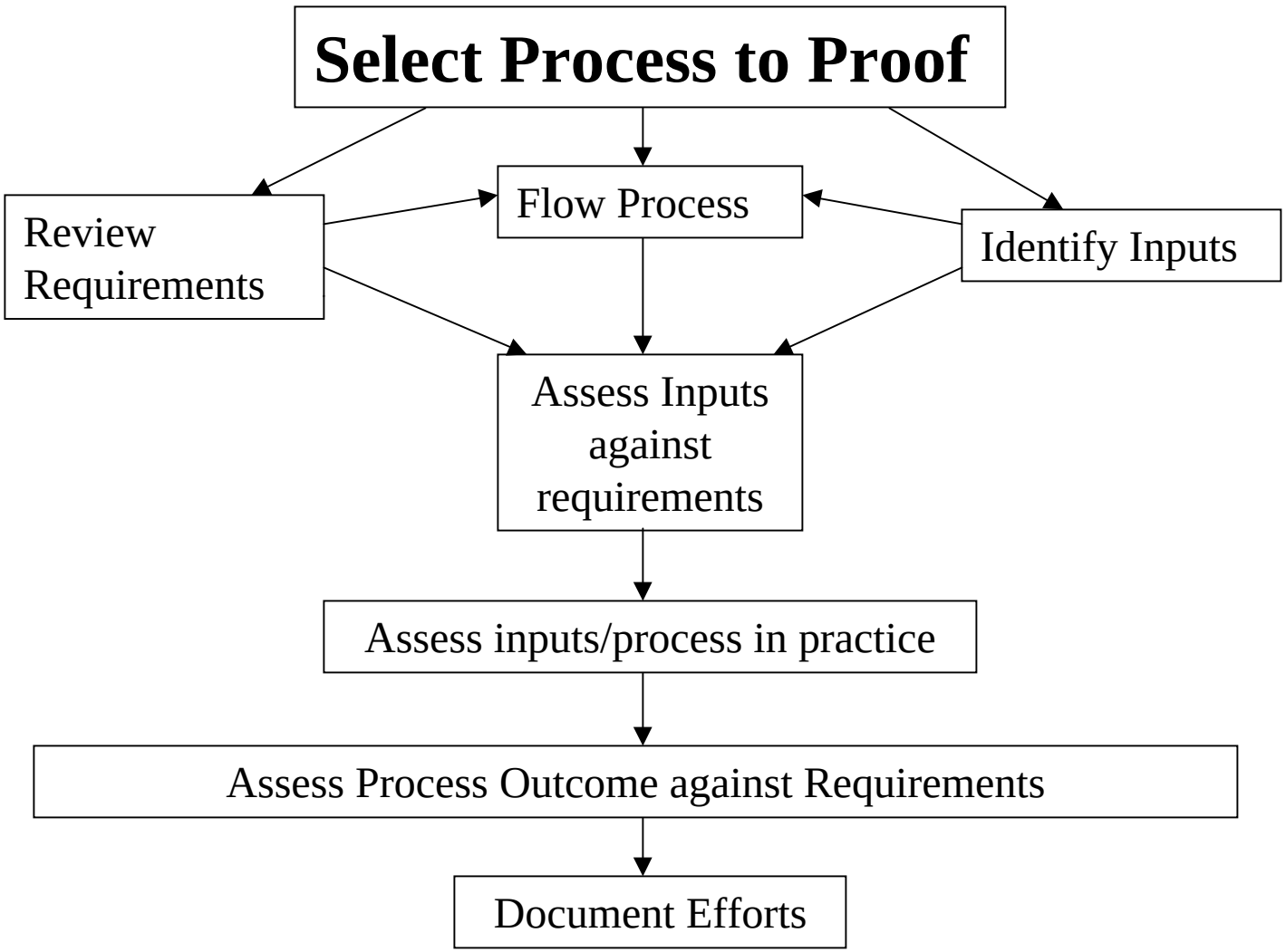
Process Proofing Flowchart or Guide

"How" - One Approach



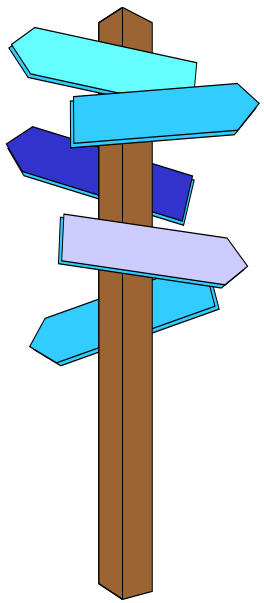
Process Proofing Flow

Could just as easily look like this



Process Proofing

- **How** - ***review process inputs against requirements***
  - **One Approach**



» Begin with Methods (one of the process ***inputs***)

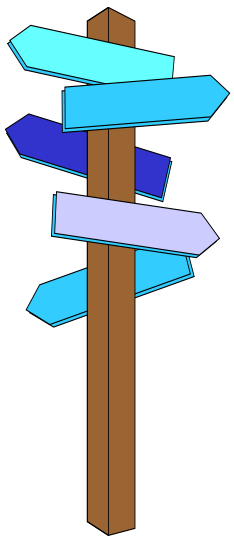
» Determine governing contractual ***cost, schedule and technical requirements***

» Assure contract requirements are flowed into/reflected in **contractor methods**

» In other words: Review Contractor's Methods, e.g.; procedures, work instructions, manuals, etc., against **contractual requirements**, e.g.; Mil-Q, ISO 9000 Standards, Mil-Specs, Commercial Standards

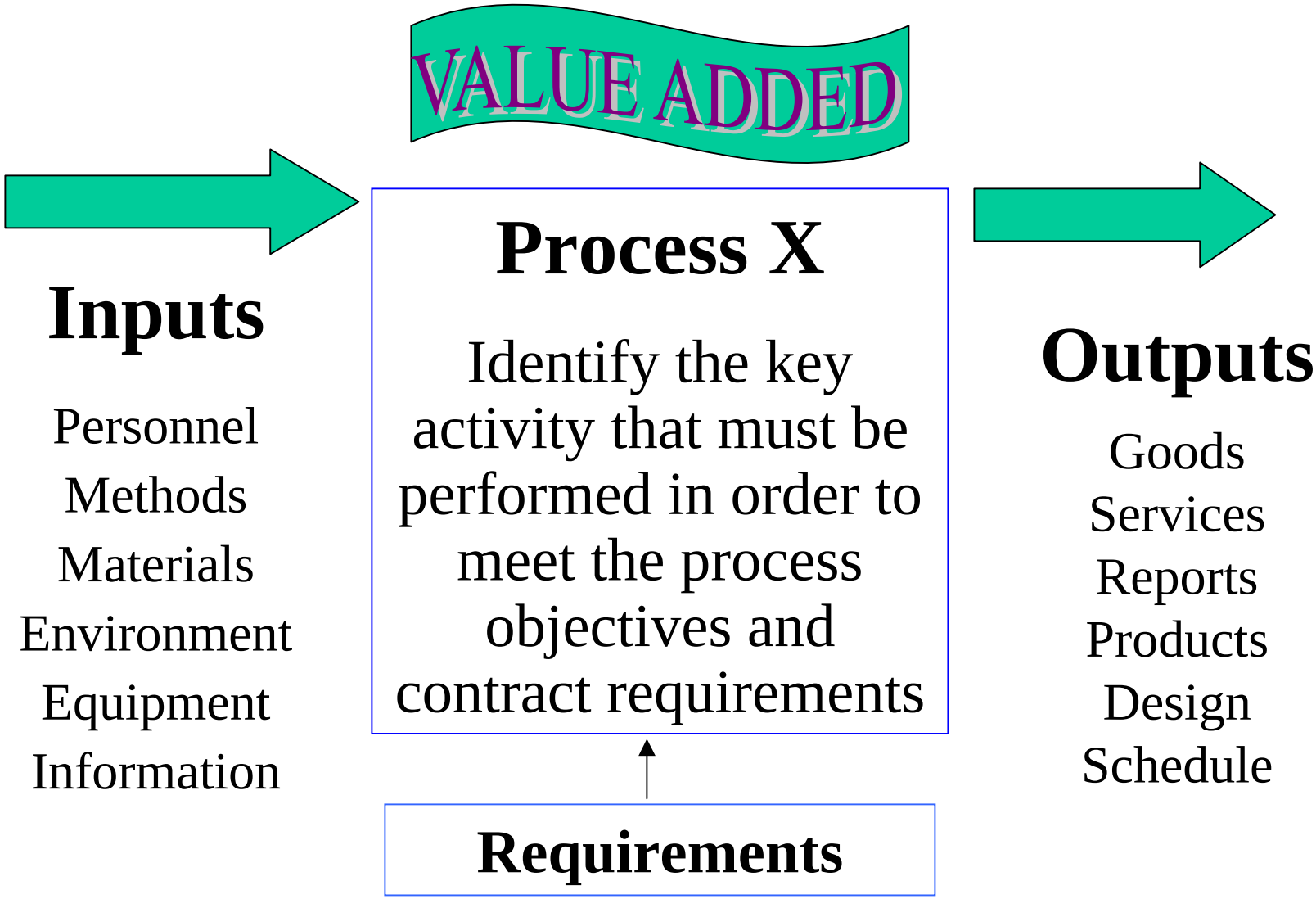
Process Proofing

- **How** - ***review process inputs against requirements***
  - Through reviewing/evaluating contractor methods you will be identifying other *requirements* and *inputs*



    - » **Materials** e.g.; type of materials *(hazmat)*, traceability, availability*(stock, order, make or buy, lead-times, vendors)*
    - » **Personnel/skills** e.g.; training, years of experience, license, certification status
    - » **Equipment** e.g.; type *(on hand,acquire or furnished)*, calibration, capability, capacity, condition
    - » **Environment** e.g.; clean-room, atmosphere controlled, EPA, safety
    - » **Information** e.g.; third party, contractor, government and/or customer records, data
  - Assure inputs are correctly/adequately addressed in methods (contractor's documents)

Typical Process



PROCESS EXAMPLE

Fuel Containment System Sealing

To achieve a leak free containment system, three critical elements are involved. The first is the cleaning process to ensure proper sealant adhesion; the second is the selection of the proper sealant for application; the third is the application of the sealant.

INPUTS

-Certified Techs
-Work Instruct.
-Materials

- Cleaning Process surface preparation
- Selection of Sealant
- Sealant Application:
Tank entry constraints
Methods of application
Environmental controls
Inspection time

OUTPUT

-Leak Free Fuel Containment System

PROCESS EXAMPLE

Configuration Management Process

Definition: Change (configuration) Control. Establishment and implementation of a plan to ensure configuration control while documenting design, hardware, and procedural changes.

INPUT

Configuration Identification
Configuration Control
Configuration Status Accounting
Configuration Audits
Drawings

Requirements Specifications: DoD-STD-100C, Mil-Std-973 or commercial equivalents

PROCESS INFORMATION

Review and evaluate per requirements: Contract/SOW, authenticated spec and applicable approved plans.

-Establish item/system baseline
-Manage and Control Changes
-Maintain current status and reports
-Perform reviews and audits...FCA/PCA

OUTPUT

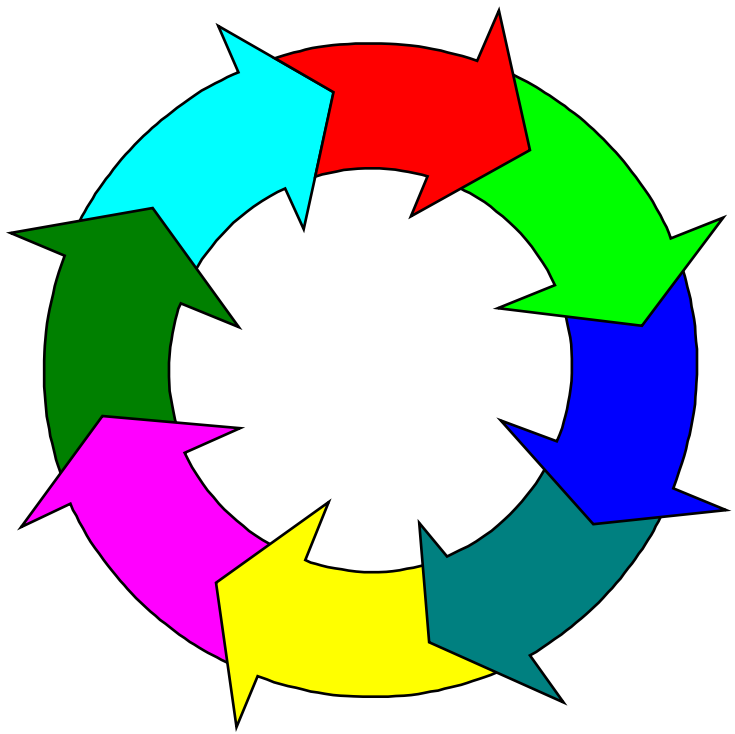
Logistics supportability

CI and documents for govt. control and contractor mgmt.

Report Certification for CI/FCA/PCA

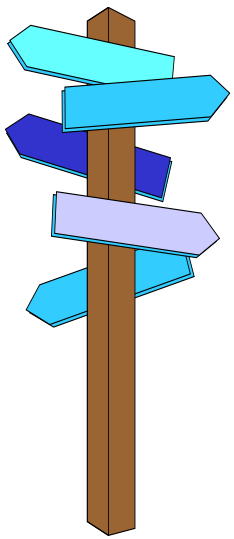
While gaining knowledge about/reviewing the process/inputs -You will also be

FLOWING THE PROCESS



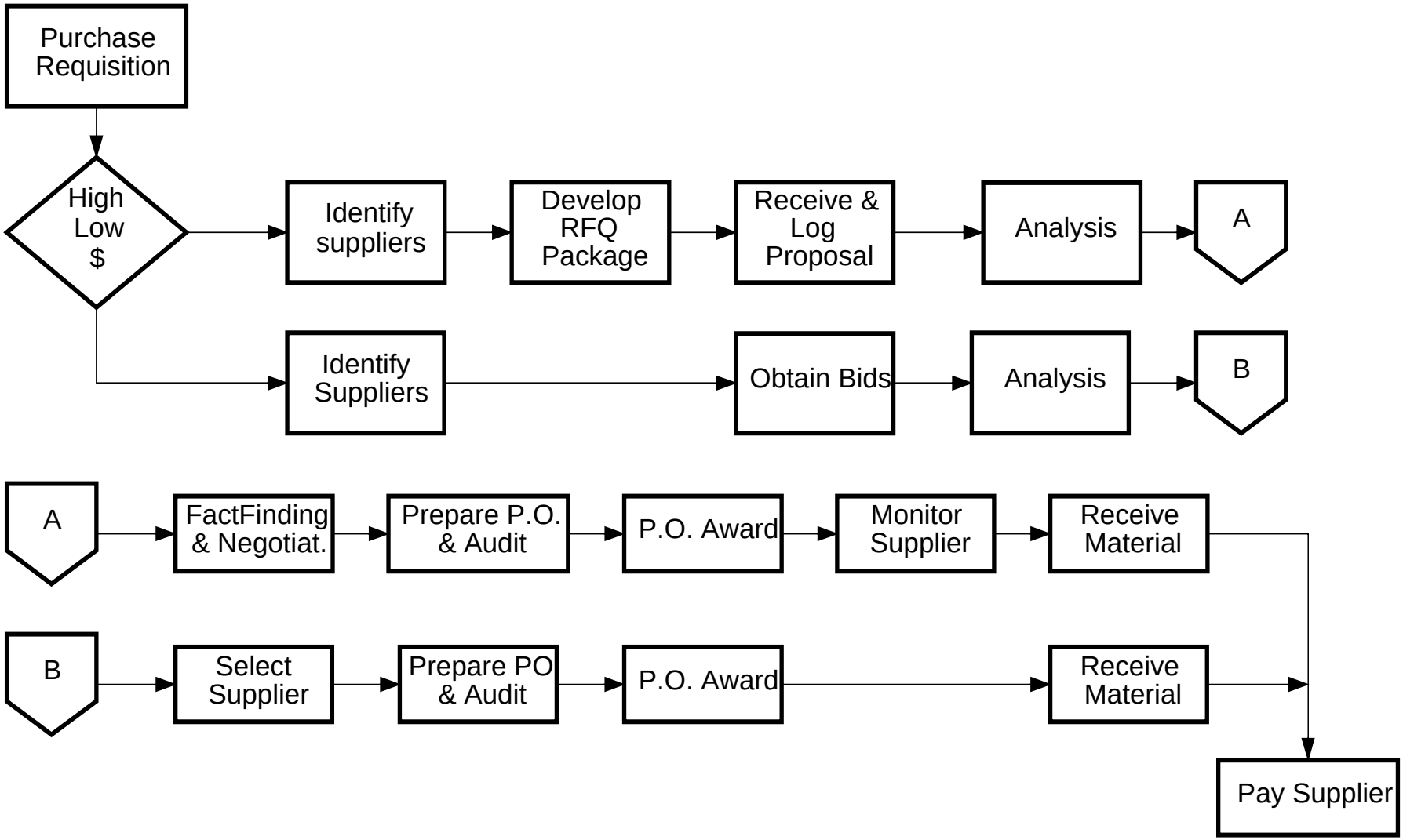
Flowing The Process

- **How**



  - » Can develop a flow chart or use a sequence of events (list of process operations or steps) or use contractor's flowchart (must verify accuracy)
  - » Develop flowchart - Walkthrough process
  - » Does it flow as described by contractor documentation?
  - » If differences in written procedures and in practice - must take action (discuss with contractor, possibly issue CAR/CIO)

Procurement Process Flowchart



☑ Understanding the Process

-Identified Requirements

-Flowed the Process

-Evaluated Contractor's Inputs (as reflected in Methods)

NOW

Assess Process as Defined

Assess Process as Defined
(Against Requirements)

- **Requires physical evaluation or monitoring of:**
  - **work in progress**
  - **verification of inputs in use**
  - **evaluating outputs of process activities/steps**

Proofing Questions

- **Methods**
  - Are methods adequate to produce conforming products
  - Are changes to these methods translated adequately and in a timely manner
  - Methods may include, but are not limited to: Work Instructions, Travelers, Procedures, Method Sheets
  - **Examples:**
    - Are work instructions available and up to date
    - Is work accomplished IAW WI or are short cuts utilized and not annotated
    - Are all documents completed as required - evaluate samples

Proofing Questions

- **Environment**
  - Are the processes conducted under controlled conditions IAW requirements
  - Can these always be controlled
  - Safety personnel/equipment available if needed

Examples:

- Are temperature and humidity gages within limits and are they calibrated and records available
- Clean Room - is all protective clothing being worn

Proofing Questions

- **Personnel/Skills**
  - Do the people have the required skill level
  - Does the contractor have a method to train personnel
  - Do the people have the proper certifications

Examples:

- Are training records available, review samples
- Are instructor credentials maintained, review
- Do they have a notification system for certification expiration dates

Proofing Questions

- **Materials**
  - Does the material(s) meet all contractual and/or contractor imposed technical requirements
  - Does the contractor have a method to assure the correct material is always used
  - Is material traceable as required

Examples:

- Are proper materials are being utilized on the floor
- Are materials properly identified

Proofing Questions

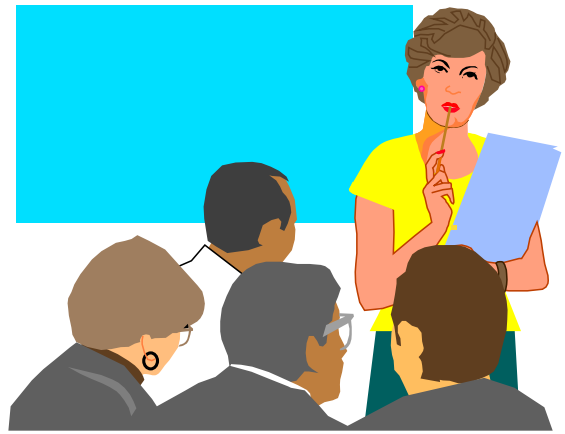
- **Equipment**
  - Is the equipment the proper accuracy
  - Is it included in the calibration program
  - Does any equipment require certification/qualification

Examples:

- Is out of calibration equipment properly identified
- Are tooling fixtures properly identified and stored
- Are parameters appropriately set, e.g.; heat settings, etc.

Proofing Questions

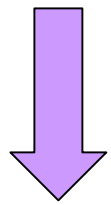
- **Information**
  - Is information pertinent
  - Is information accurate
  - Is information timely
  - Is information validated



- **Example:**
  - Do Purchase Orders have complete description of product ordered
  - Are delivery forecasts maintained and updated
  - Are engineering drawings updated
  - Is data correctly recorded, maintained and used

After Assessing Process as Defined

Next Step

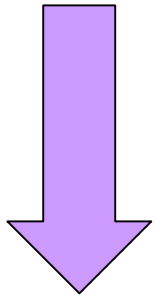


Assess Process Output Against Requirements

Assess Process Output Against Requirements

- Sample Process Output, i.e.; product against the requirements and verify compliance
  - Examples:
    - Review Purchase Orders as a product of the Purchasing Process
    - Inspect manufactured items as product of a manufacturing process such as soldering, welding, coating, machining, painting, etc.
    - Review MRB documents as one of the products of the NCM Process

After Assessing the Output



Document

Process Proofing

Efforts

Documenting the Proofing Effort

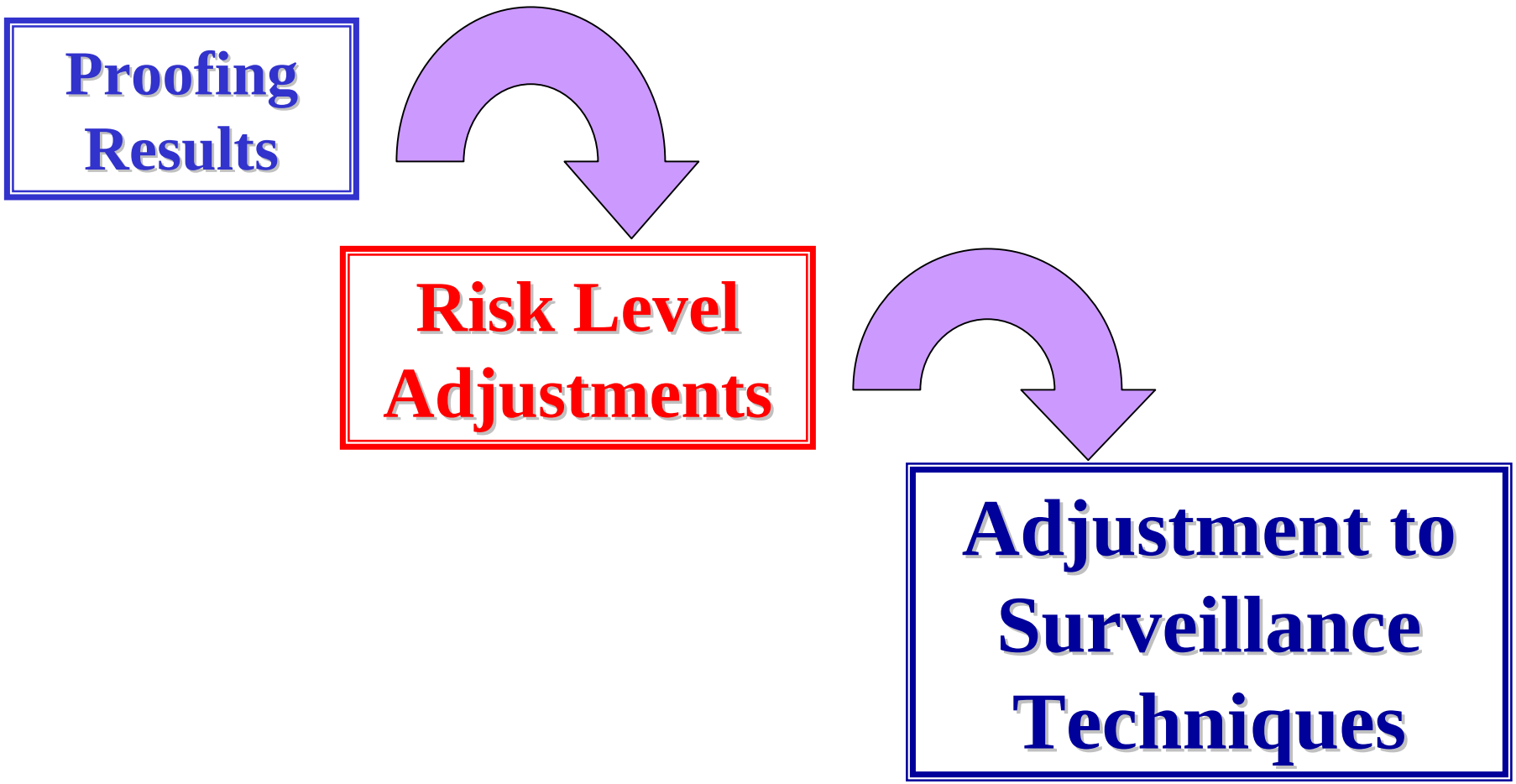
- **Process proofing documentation should be of sufficient detail to:**
  - Answer the questions: **W*ho? What? When? Where? How?***
  - Documentation should describe: the process requirements, inputs, and steps; the methods used to evaluate them; the results of the evaluation; and any follow-up action necessary

Simple Check Sheets are Insufficient

Utilizing Process Proofing Results

- **Used to Identify Weaknesses in a High Risk Process (CARs/CIOs)**
- **Used to Identify Areas for Improvement**
- **May be used to Establish Confidence in Processes Rated as Moderate Risk**
- **Used to Adjust Plan and Redirect Resources**

Adjusting Surveillance Plan



Adjusting Surveillance Techniques

- **Data Collection**
  - Increase or decrease data/reports collected and analyzed
  - Establish new points for data collection

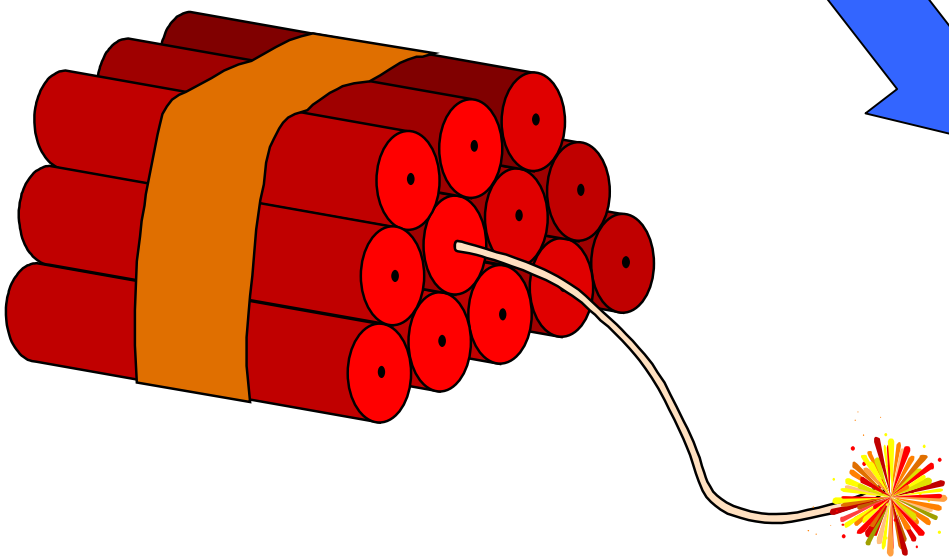
- **Product Audit Points** *(process measurement)*
  - Eliminate or add PA points
  - Reduce or increase frequency and/or intensity

Identifying Process Improvement

- **Reduce variability, defects & costs**
- **Increase process capability, effectiveness, & productivity and on time delivery**
- **Increase customer satisfaction**
  - "***Total quality control is an effective system for integrating the quality-development, quality-maintenance, and quality-improvement efforts of the various groups in an organization so as to enable production and service at the most economical levels which allow for full customer satisfaction***"

Armand Feignbaum

REDIRECT RESOURCES



DANGER
HIGH
RISK
AREA

Process Proofing

Summary

&

Discussion